

‘Music Engagement at mid-life on the Guitar’ by Bruce Stewart***Theory evidenced through sound***

Many musicians, having confidence in their knowledge of music, have come to understand the overall processes involved, are quite manageable, with sufficiently developed physical skills (Bruning, 1999)[p37]. Skill development in music is monitored by listening – evaluating the sound produced. Theoretical principles, also reveal themselves through sound – mathematical computations are largely unnecessary to the keen listener (Denyer, 1982)[p70]. By appreciating music theory aurally, the late starter will have a distinct advantage. As we unravel music theory, at each step along the way, play the sounds described and try to use this information to increase your understanding (Diallo, 1989)[p96]. Music theory is not just written instruction – for every mathematical association there is a corresponding sound (Denyer, 1982)[p71].

String length and tension

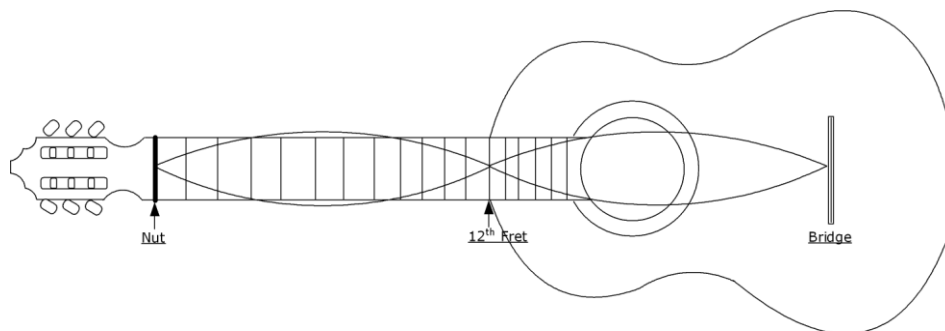
String length and tension effect pitch - a thick rope spanning over a river could be contrasted with an elastic band wrapped around a matchbox. Obviously, the rope would generate a deep sound and the elastic band would make a high sound. Can you see the forces that are at play governing the pitch of a string? They are: length – [the longer the deeper the sound] – and tension [the tighter, the higher pitch] (Denyer, 1982)[p68]. When fretting notes along one string on the guitar – we are effectively changing the length of the string, since we are only concerned with the remaining string between the left hand fretting finger, and the bridge [end of string] (Denyer, 1982)[p68]. The difference between a guitar and a piano is that the piano has a separate string [cut to size] for every note. The guitar has six strings only, but there is provision for shortening each string by numerous degrees – frets.

Twelve Note Theory

Natural divisions of the string

I will begin by examining the vibration of a string – think of a skipping rope held firmly at either end. All strings behave in a similar manner. If you touch a vibrating string at the mid-way point, which on a guitar is above the 12th fret, the vibrating string will split into two half vibrations, with a new pitch one octave higher than the original (Vella, 2000)[p57]. The sound is called a harmonic and is equivalent in pitch to the sound produced by fretting [or pushing down] at this same point (Denyer, 1982)[p116].

[the pitch is the highness or lowness of sound – the range, and one octave is the difference commonly found between men and women’s voices – when singing in unison, the male voice will be singing one octave below the female voice – effectively we consider them to be singing the ‘same note’ but try thinking of the female range as a ‘miniature’ version of the male range.]

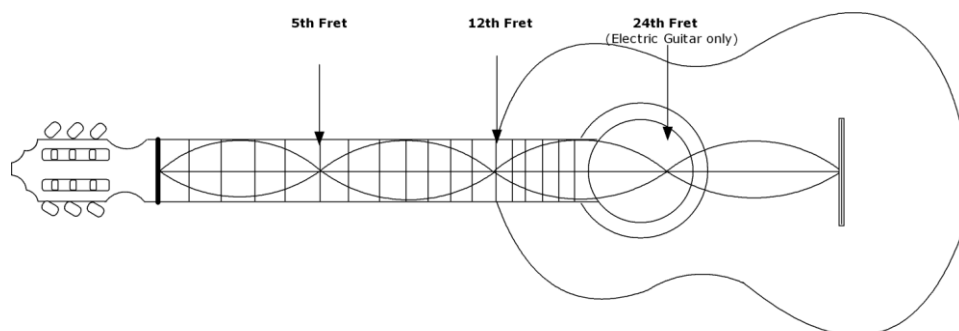


Origin of fret locations

By touching a string at the quarter-way point [above the 5th fret], the string will split into 4 quarter vibrations, producing a sound two octaves above the open string (Denyer, 1982)[p116]. In fact there are several other mathematical splitting points [node or stationary point] along the string (Taylor, 1978)[p18]. Each node will produce new sounds and has a corresponding fret directly beneath (Denyer, 1982)[p116].

Imagine your guitar without frets – like a violin. By knowing the half and quarter string divisions, we could begin to figure out just where the frets should be located. At this early stage, we would place a fret directly underneath the center of the string [where the 12th fret is located]. We would also place a fret at the quarter-way point – [occurring either side of the half-way point] (Denyer, 1982)[p116]. This would be where the 5th fret is located and also where the 24th fret is located [not available on acoustic guitars].

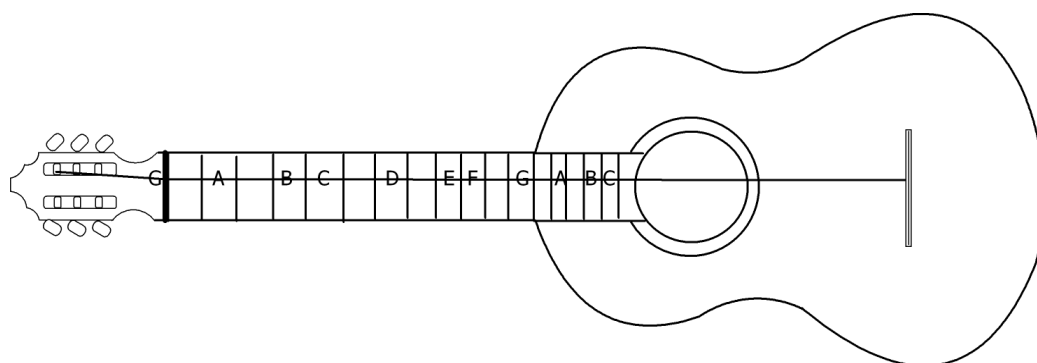
By observing the natural nodal points [or ‘splitting’ points], we can predict the location of the frets.



The octave divided into 12 notes

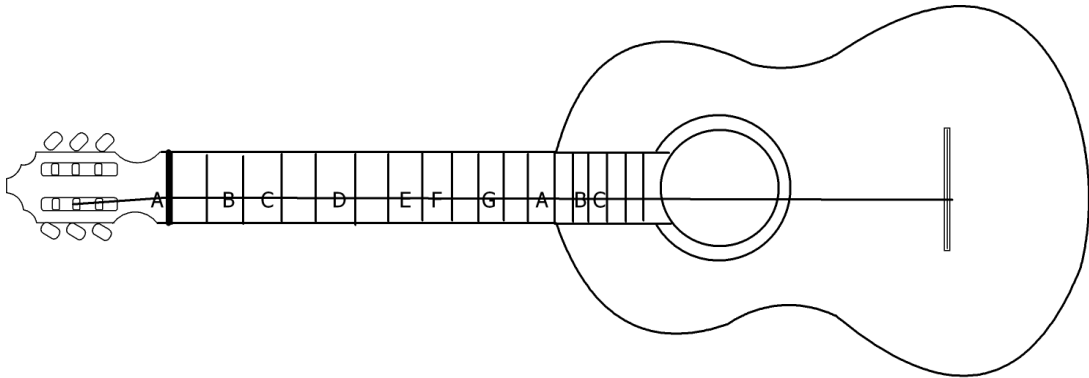
The centre point of each string [at the 12th fret], is one octave above the open string – and within this octave, are the twelve notes utilized for playing – keeping in mind that we can have access to two or three other octaves of these same notes (Denyer, 1982)[p68].

When we speak of music being in one key or another, we are simply referring to the specific starting point – for example: the key of G could be identified as the twelve notes laying between G on the sixth string [3rd fret] and G one octave higher on the 15th fret (Denyer, 1982)[p104]. Alternatively, we could have started on the G or 3rd open string and climbed to the 12th fret. Although these two scenarios begin an octave away from each other, they effectively produce the same notes. If we continue, on the ‘G’ string to the 13th fret and beyond we will find ourselves playing the same notes in ‘miniature’ form – one octave above (Denyer, 1982)[p103]. In other words, beyond the 12th fret, the note names are identical, although each one sounds one octave higher than the original twelve. That is to say the 13th and 14th frets will be equivalent to the 1st and 2nd fret notes – only one octave higher (Denyer, 1982)[p108].



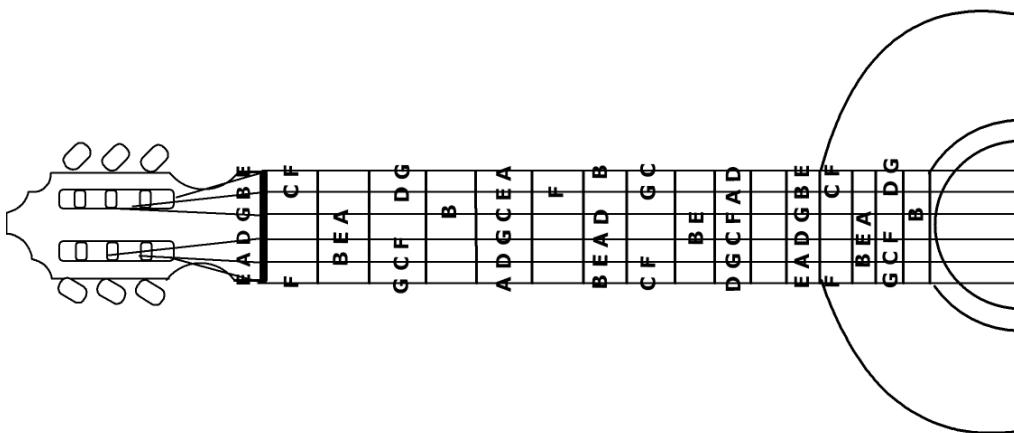
Refining the selection

Prior to the eleventh century music consisted of just seven notes (Gaare, 1997)[p2]. From a total of twelve, five notes were omitted. The sound of these seven remaining notes when placed in order, is related to the sound of the Major scale – a sound many Australians can trace back to early school – ‘Doh, Rae, Me’ (Gaare, 1997)[p2]. These seven notes are given alphabetical names – A, B, C, D, E, F, G and A [one octave above the start].(Gaare, 1997)



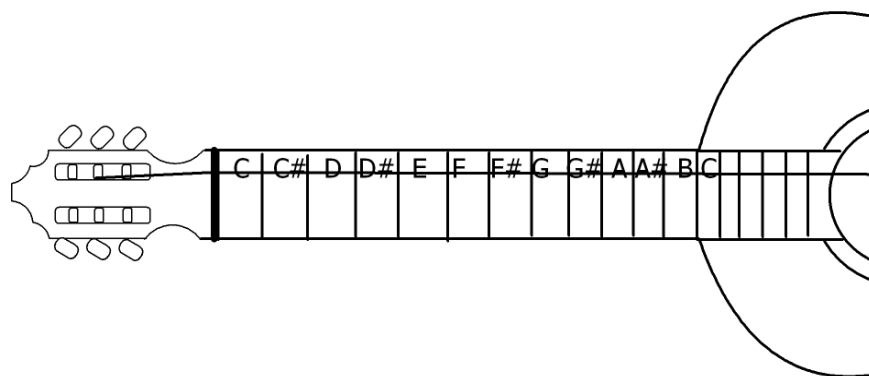
Spacing of the notes

To explain the irregular spacing of the notes, I simply bring to the students attention the math required to distribute seven letter names over twelve frets. Simply twelve [the number of frets requiring names], cannot be divided evenly by the number of names available – seven. For this reason, two neighbouring letter names [B & C and E&F], must sit side-by-side (Denyer, 1982)[p68].



In between notes

Seven of the available twelve notes now have names. The five remaining notes borrow their names from their neighbours. The symbols we use to identify the in-between-notes are sharp [#] and flat [b]. These names are self evident if you remember that 'sharp' means to raise and 'flat' means to lower. Therefore the note between A and B, could be called either A #, or Bb.



Bibliography

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